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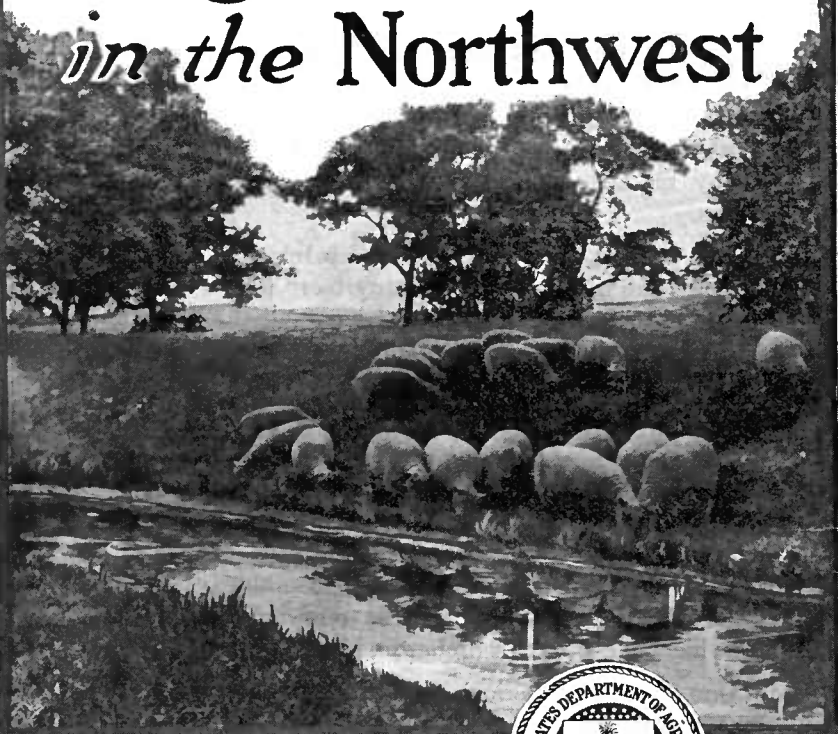
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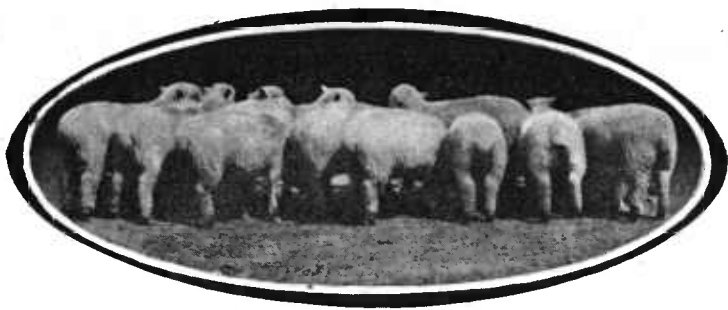
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# SHEEP *on* Irrigated Farms *in the* Northwest



## FARMERS' BULLETIN 1051

United States Department of Agriculture



**S**HEEP are kept with profit on numerous farms scattered throughout the irrigated districts of the Northwest. On some of these farms they have been kept with success for many years, so that sheep raising is by no means an experimental enterprise on such farms.

The present outlook for the sheep business appears to warrant the maintenance of many more farm flocks than are now being kept in these districts, and this bulletin is designed to further the expansion of the industry by pointing out its possibilities and by giving examples of good farm practice with sheep.

The methods of handling and feeding sheep as practiced on 12 representative irrigated farms, large and small, and in various parts of the Northwest, are described in some detail. A few of these farms specialize in sheep, but on most of them the sheep enterprise is combined with some other major enterprise, such as dairying, hog raising, growing sugar beets, or orcharding.

One of the more serious problems that the farmer must face in introducing sheep on an irrigated farm is that of pasture; hence special attention has been given to outlining methods to be followed in establishing pasture grasses and pasture supplements.

Office of the Secretary  
Contribution from the Office of Farm Management  
E. H. THOMSON, Acting Chief  
Washington, D. C. August, 1919

# SHEEP ON IRRIGATED FARMS IN THE NORTHWEST.

STEPHEN O. JAYNE, *Agriculturist.*

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## OUTLOOK FOR SHEEP PRODUCTION IN THE NORTHWEST.



URING THE PAST FEW YEARS a nation-wide interest has developed in the production of sheep, particularly in farm flocks. Because of their value for meat as well as wool, sheep merit special attention at this time. Various agencies are operating to bring about a revival of the sheep industry in regions where it formerly thrived and to establish and develop it in others where conditions are favorable.

Little, if any, increase in production of sheep on western ranges can be expected, as most of the grazing areas are now fully stocked, and it is generally conceded that any material increase must come through the development of farm flocks. In no part of the country can the production of sheep in small flocks be undertaken with better prospects of success and profit than on irrigated farms of the Northwest.

### RELATION OF IRRIGATION FARMING TO LIVE-STOCK PRODUCTION.

Irrigation farming in the Northwest since its beginning has borne an intimate relation to the production of live stock. Most irrigated areas are either in the midst of, or not far distant from, vast areas of mountainous, rough, or arid lands suitable only for grazing, and which have for years been utilized for the production of cattle, sheep, and horses. Practically all cattle and sheep men count on a winter feeding period of 2 to 5 months. Enormous quantities of forage are required for wintering or fattening range stock. The bulk of this forage is produced and fed on irrigated farms. It is highly desirable

that this relationship between irrigation farming and stock raising on the ranges be perpetuated. The carrying capacity of ranges should be increased by intelligent management, and a primary function of most irrigated areas should be to provide abundant forage for all the stock the ranges will carry.

In some regions of the Northwest the greater part, if not all, of the forage grown on irrigated farms is needed for range stock. Keeping much farm stock is therefore precluded. But on the more important irrigated areas of Idaho, Washington, and some other States,



FIG. 1.—An irrigation canal, showing sheep on the bank. Ditch banks usually produce a rank growth of sweet clover, willows, and noxious weeds. They should be grazed clean. Sunnyside Canal, Yakima Valley, Wash.

crop production has advanced far beyond the requirements for winter feeding of range stock, so that opportunity is afforded for independent animal production on the farms. In fact, conditions on most irrigated farms not only favor the keeping of some form of live stock, but go far toward making animal enterprises essential to profitable farm management.

The crops grown consist largely of forage and cereals. Other crops of great importance are sugar beets and potatoes. Bulky forage crops, not being suited for shipment to distant markets, usually pay best when fed on the farm and converted into animal products. The other crops grown, especially sugar beets and cereals, usually bring the largest returns to the farmer who has animals to utilize the beet tops, pulp, straw, and other by-products that would otherwise be largely wasted. On many irrigated farms there is land suit-

able only for pasture. Such land should be utilized. Ditch banks, in particular, which usually produce a rank growth of sweet clover and weeds, should be grazed clean (fig. 1). Live stock is also needed on these farms as a means of building up and maintaining the fertility of the soil.

In most irrigated regions where efforts have been made to establish animal industries, preference has usually been given to dairying and hog raising. Under normal conditions, both dairying and hog raising merit the attention of irrigation farmers, but the scarcity of laborers and the high price of grain and other supplies during recent years more especially favor the production of sheep. All three forms of animal industry, however, may be, and often are, maintained on the same farm. If for no other reasons, many farmers at present prefer sheep because they require less labor than either dairy cows or hogs, and because the most exacting of the labor required comes late in winter or early in spring (lambing time) when it does not conflict much with other farm work. Another point in favor of sheep is that with good forage they can be maintained with little or no grain.

#### **PRESENT STATUS OF THE SHEEP INDUSTRY ON IRRIGATED FARMS.**

Winter feeding of range sheep on the farms of most irrigation projects is a practice now quite definitely established on a permanent basis. Many of these sheep are brought in from the ranges early enough in the fall to be used in cleaning up grain fields and beet fields after harvest and to be pastured for a time on meadows after the last crop of hay has been put up. In some instances the range sheep are held in the vicinity of the irrigated farms until after lambing in the spring (fig. 2). Usually the irrigation farmer is interested in the range sheep industry chiefly as a market for surplus feed.

The other phase of the sheep industry, that of keeping sheep on irrigated farms throughout the year as a regular part of the farm business, has not become so well established. However, on a few irrigated farms, widely scattered throughout the West, sheep have been kept with success and profit for many years, and in some irrigated regions marked progress has recently been made in the development of flock husbandry. For several years sheep have been kept on a considerable number of farms in the upper part of the Yakima Valley near Ellensburg, in Washington, on a few farms lower down the valley, and to some extent elsewhere in the State. In Crook and Deschutes Counties of central Oregon, 25 or more farm flocks were established in the fall of 1917. Greater progress along this line has been made in the Wallowa and Grand Ronde Valleys, in the north-eastern part of the State. In Montana, a few farm flocks have been started by irrigation farmers in the Yellowstone and Gallatin Valleys.

The most notable development of this phase of the sheep industry, however, is found in southern Idaho, on the Minidoka and Twin Falls areas and in the Boise Valley.

#### **SHEEP MOST COMMON ON LARGER FARMS.**

On the Minidoka Project alone in 1916, sheep were kept on 289 farms, the total number on all farms amounting to over 21,000. On the Boise Reclamation Project in 1916, sheep were kept on 154 farms. The number of sheep on irrigated farms has increased rapidly during the past 2 years, but the farm flock industry is still in an early stage of development. The total number of farms on which sheep



FIG. 2.—Sheep on lambing grounds on a southern Idaho farm. The range sheep are brought to the irrigated farms in the fall early enough to clean up the grain and beet fields, and are kept there in the spring until after lambing time.

are kept as yet constitutes but a small percentage of all irrigated farms or of farms on which sheep might be kept to good advantage.

In general, sheep are most common on the larger farms and on the ones having land which for some reason is suitable only for pasture. In southern Idaho most farm units on the Minidoka Project are of 80 acres; on the Boise Project the size is about the same, while Twin Falls farms average perhaps a little larger. In the Yellowstone Valley, Montana, the farms on the Huntley Reclamation Project mostly range from 40 to 60 acres; on the other projects which constitute the greater part of the irrigated area of this region, they range as a rule from 140 to 160 acres. In Washington the irrigated farms generally are of less than 80 acres, while in the fruit-growing

sections most of them are of less than 40 acres. Sheep pastures are being established in the Northwest on land valued at from \$150 to \$300 per acre.

A majority of the farm flocks are composed of grades which have come from mating pure-bred rams of the medium or long-wool breeds with range foundation stock usually carrying a half or more of fine wool blood, Merino or Rambouillet. Rams of the Hampshire, Lincoln, and Cotswold breeds have been most popular. A considerable number of farmers keep only pure-bred sheep. They are mainly of the mutton breeds above mentioned, with which Shropshires should also be included.

Most irrigation farmers who keep sheep keep other live stock as well, usually either dairy cows or hogs, often both. In a few instances sheep are kept as the only revenue-producing live stock.

The income from grade flocks comes mainly from the sale of wool and lambs. Lambs from the principal producing areas go mainly to Omaha and other mid-western markets, shipments being made largely in connection with range sheep. From the pure-bred flocks an important source of income is the sale of rams for use with range bands. There is, in this respect as well as in some others, an intimate, mutually advantageous relationship between farm sheep production and range sheep production.

### **ESSENTIALS FOR SUCCESS WITH SHEEP.**

The success and stability of the sheep industry in any region will depend largely on the quality of judgment exercised by the individual farmer in getting started; on the care and management of the flock; on maintaining a proper relationship or balance between this industry and other enterprises of the farm; and on the cooperation of farmers who engage in the business.

### **GETTING STARTED WITH SHEEP.**

For the man who has not had previous experience with sheep, it is advisable, as a rule, to start with grade ewes rather than with pure-bred animals. The grades are usually more readily available and cost less. They may be purchased from owners of range bands. The best time to get them is in the summer or early autumn, when the range men are cutting down their bands for the winter. It is best to be conservative and start on a small scale. As experience is gained, the flock may be increased.

Where farmers desire to begin in this way with flocks of from 20 to 50 ewes, it may facilitate delivery and be more economical for several to buy at the same time, so as to take several hundred ewes, or the entire surplus from a range band, rather than for each farmer to buy separately. County agricultural agents are usually in a position to learn of good ewes available from range bands, and in



some localities, upon their recommendation, local banks have assisted in financing the purchase of foundation stock, where such assistance was needed.

To a limited extent, farmers who live near the lambing grounds of range bands may start farm flocks by purehasing orphan or disowned lambs at \$1 or less per head. Many flocks have been started this way, but it involves considerable labor to raise such lambs on cow's milk, and few men have the patience to do it.



FIG. 3.—A cheap, easily-constructed, but comfortable straw shed on a southern Idaho farm. Many farmers get along for years with sheep sheds like this.

#### **SIZE OF FLOCK.**

As a rule, sheep on farms do better and are not so liable to become diseased if they are kept in comparatively small flocks. A few farmers may specialize successfully in sheep to the exclusion of practically all other farm enterprises, but this type of farm organization is not generally to be recommended. It is better for most farmers to diversify to some extent. The tendency to overstock with sheep should be guarded against. On comparatively few irrigated farms is it advisable to keep regularly more than about 100 ewes, while on the average farm it is believed that flocks of from 40 to 60 ewes will do better and give larger returns on the investment than will larger flocks.

#### **BUILDINGS AND EQUIPMENT.**

In starting with sheep, the farmer need not go to much expense at first for buildings and equipment. Many get along for years with nothing more than a straw-thatched shed similar to the one shown in figure 3, and a few feed racks, panels, etc., which cost but little. After the experimental stage of the farmer's experience is past, and sheep have become established as a permanent farm enterprise, it

usually will be desirable to provide something better in the way of shelter, lambing sheds, etc.<sup>1</sup> For early lambing, comfortable quarters are essential. Excellent buildings for sheep are to be found on many farms in southern Idaho, where lambing begins early in February. (See figure 4.)

As a rule, every farmer who expects to keep sheep should inclose the entire farm with sheep fence. Usually more or less cross fencing also will be required for pasture lots, etc. At war prices, the necessary fencing may involve greater expense than anything else

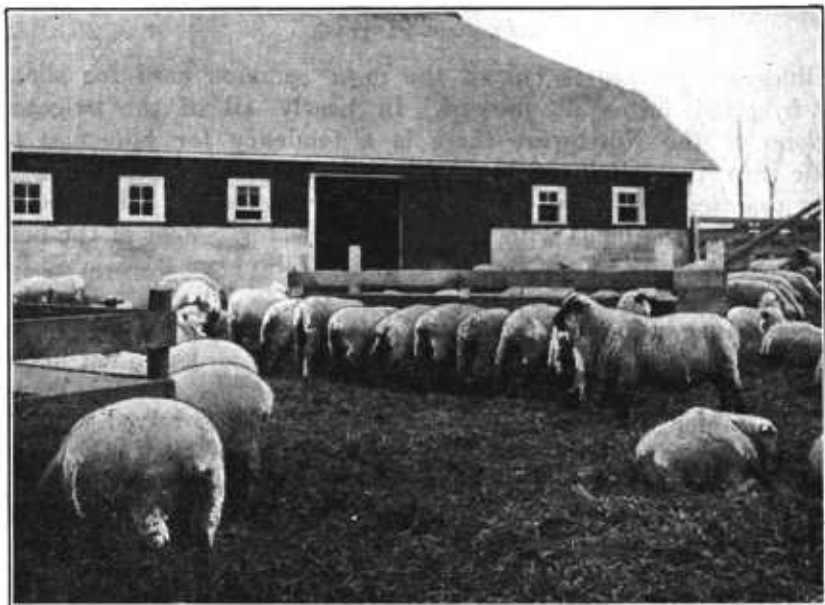


FIG. 4.—A farm flock on the Twin Falls tract, showing a type of the substantial buildings with which many farms are equipped.

required in starting, but the fencing may be regarded as a permanent improvement. To inclose sheep alone, woven-wire fencing 32 to 36 inches high is sufficient, but if cattle or horses are to be pastured also, the fence will require about two barbed wires above it. In the fall of 1917 a good quality of woven-wire fencing, 32 inches high, cost southern Idaho farmers about 50 to 55 cents per rod, and cedar posts 17 to 25 cents each.

#### FEEDS.

A prime requisite for success with sheep is an abundance of good feed. While sheep will utilize many kinds of waste products and be useful in keeping down weeds, etc., it is a mistake to expect them to thrive and be profitable if left to shift for themselves. They require special summer pasture, wholesome winter feed, and close attention

<sup>1</sup> For plans of sheep buildings and equipment, see Farmers' Bulletin 810, also U. S. Department of Agriculture Bulletin 573.

throughout the year, especially during the lambing season. In connection with feeding, the most important problem which the average irrigation farmer has to consider is that of providing suitable pasture. That pastures of various kinds are being used with success will be shown by citing individual farms farther on. Some farmers favor one kind, some another, and opinions differ also as to the relative merits of different methods of pasture management. What is best in one place may not be best under other conditions. It is for each farmer to decide for himself what will be most advantageous on his own farm.

#### BLUEGRASS PASTURE.

Bluegrass pasture is one of the most common used for sheep on irrigated farms at present. In nearly all of the irrigated regions of the Northwest there is a tendency for bluegrass to come into the alfalfa fields, and under favorable conditions it may practically run out the alfalfa in a few years. The seed is brought into the fields with the irrigation water. Most of the best bluegrass pastures of the Boise Valley in Idaho have become established in this way. The bluegrass is hard to kill out, and with proper management will remain productive for many years. Being shallow-rooted, it requires frequent irrigation in order to get maximum growth. It makes very good sheep pasture, though many farmers prefer to have some white or alsike clover mixed with it. Where the clover does not come in sufficiently of itself, the bluegrass may be disked, and then harrowed with a spike-tooth harrow after sowing clover seed on it. Good results have been obtained in this way. The mixture makes a better balanced feed than bluegrass alone.

#### PASTURES OF MIXED GRASSES.

Many mixed-grass pastures have been established for sheep and other live stock in southern Idaho, and, to a smaller extent, such pastures are being established in other parts of the Northwest.<sup>1</sup> The mixture recommended by the Gooding (Idaho) Experiment Station for ordinary conditions in southern Idaho is as follows: Smooth brome grass, 5 pounds, Kentucky bluegrass, 4 pounds; meadow fescue, 4 pounds; timothy, 4 pounds; alsike clover, 2 pounds; orchard grass, 5 pounds; a total of 24 pounds per acre. On the Huntley Reclamation Project, in Montana, farmers are using a mixture recommended by the superintendent of the Huntley Experiment Farm. It is as follows: Smooth brome grass, 3 to 4 pounds; Kentucky bluegrass, 4 to 6 pounds; orchard grass, 4 to 6 pounds; meadow fescue, 3 to 4 pounds; white clover, 1 to 2 pounds; alsike clover, 1 to 2 pounds, making a total of from 16 to 24 pounds per acre.

<sup>1</sup> See University of Idaho Agr. Exp. Sta. Bulletin 95, January, 1917; also *Irrigated Pastures for Northern Reclamation Projects* (United States Department of Agriculture, Bureau of Plant Industry, D. R. P. 2, July, 1916).

For a permanent pasture of mixed grasses, it is desirable to have fairly level, smooth land. It should be prepared carefully so that it may be irrigated quickly, preferably by flooding between borders. Pastures should be divided into two or more lots so arranged that they may be irrigated separately. When one part is being irrigated the sheep should be kept on another. It will be better also to keep the stock off for a short time after irrigation, particularly if the soil is heavy. In most instances, pastures are managed with indifference in this respect. An acre of well-established bluegrass or mixed-grass pasture, if properly irrigated and managed, will carry 6 to 10 ewes throughout the pasture season. Pastures should be provided with good water.

#### ALFALFA AND CLOVER.

Alfalfa is grown on almost every irrigated farm, and clover on a great many. Both alfalfa and clover make good sheep pasture, though their use for this purpose is usually attended by some loss from bloat. Pasturing alfalfa fields in the fall after the hay is off has been a common practice for years, and is not likely to be discontinued. Many now pasture for a few weeks in the spring, also, and then cut for hay. In the high altitudes, particularly in central Oregon, this practice utilizes the early growth of alfalfa which otherwise is very liable to be lost by frosting. In other places, pasturing is said to help in destroying "cheat," a wild grass which is often very bad in the first cutting of hay. As shown later, alfalfa or clover may be used successfully alone, or mixed with orchard grass, meadow fescue, or other grasses for summer pasture.

Alfalfa pasture should not be kept continually close cropped as may be done with bluegrass. When alfalfa plants are allowed to come to maturity before cutting, the total yield is much greater than when they are clipped frequently.<sup>1</sup> The alfalfa should be permitted to get several inches high, or, better still, nearly mature enough for hay before the sheep are admitted. The pasture should be divided into several lots which should be used in rotation. They should be small enough so that the sheep need not be left longer than a week or two at a time on any one in order to get the best of the feed. If a judicious system of rotation is practiced in the use of alfalfa or other pasture, a great deal more feed may be produced, and the sheep are less liable to parasitic infestation<sup>2</sup> than when not frequently changed. Pasturing alfalfa by a rotation system in this way is practiced very successfully in the irrigation valleys of southern Arizona. There the alfalfa is allowed to become about mature enough for hay before stock is admitted.<sup>3</sup>

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<sup>1</sup> See U. S. Department of Agriculture Bulletin 228.

<sup>2</sup> See Farmers' Bulletin 840, p. 20.

<sup>3</sup> See U. S. Department of Agriculture Circular 54, also Bulletin 654, Farm Organization in the Irrigated Valleys of Southern Arizona (June, 1918).

*Loss from bloat.*—Because of its tendency to cause bloating, some stockmen contend that alfalfa should never be pastured at all by cattle or sheep. This, however, is an extreme view, and not generally tenable. It must be conceded that pasturing alfalfa or clover involves some risk, and for animals especially valuable, the practice is not recommended. But with stock of ordinary value, the possibility of gain from pasturing these legumes may be sufficient to warrant the risk of losing a considerable number of sheep each year. Some successful sheepmen have continued to use alfalfa for pasture for many years notwithstanding annual losses ranging from 5 to 10 per cent from bloat.

A large part of the loss of sheep by bloat is doubtless due to lack of attention and improper management. According to the experience and observation of various men who have pastured sheep on alfalfa, the following are some important points to be kept in mind with a view to minimizing loss from bloat:

Sheep should not be turned into alfalfa when hungry. It is best to give them alfalfa hay or other feed first and turn into the alfalfa only after their hunger is about satisfied.

When once started on alfalfa pasture, it is best to keep them there day and night rather than to remove at night.

After feeding heartily on alfalfa, sheep should be kept quiet. Hurred movement in this condition, especially during warm weather, is very liable to cause bloating. Bloating may be induced by this cause if sheep are compelled to go some distance from the feeding ground to get shade. Unless shade is provided so close as to make such travel unnecessary, it may be better to have none.

Sheep are less liable to bloat on alfalfa that is nearly mature than they are on young, succulent growth.

Various remedies for bloat might be cited, including the use of the trocar and canula, but if sheep are carefully looked after and handled with good judgment, it will not often be necessary to resort to remedies. Doctoring sheep is a very unsatisfactory business. Prevention is better than cure.

#### PASTURE SUPPLEMENTS.

In the description of several individual farms to be presented further on, attention will be called to the way grain stubble, the aftermath of hay fields, beet tops, etc., are used to supplement the regular pastures. Such feeds are of considerable value and importance, especially on the larger farms. Many of the smaller irrigated farms do not ordinarily produce any small grain, and sugar beets are by no means generally grown. In going about over the country, one may note the very general tendency to overstock pastures, and it seems clear either that less stock should be carried, or that some supplementary feed be provided. As yet little

attention has been given to growing such feed for either sheep or other stock. But as the sheep industry develops, the use of forage crops to supplement pastures will doubtless become more common on irrigated farms.

In central Oregon one man was found who sows rye with about 4 pounds of rape seed per acre. Only enough rye is used to give a thin stand. This is put on land for which he can not spare water early in the season, consequently it is not irrigated until late in the summer. This feed comes on for use in "flushing" the ewes before breeding early in October, and is an important supplement to his regular pasture. He carries something over 300 ewes.

In the Yakima Valley, Wash., small grain is not grown very generally, but corn is coming to have a place on nearly every farm. It gives large yields either as grain or for silage. Some farmers permit the sheep to run in the cornfields after about the first of August. By this time the corn is so large that the sheep, as a rule, do not molest it except to pick off the lower leaves, but they get considerable feed in cleaning up weeds, water grass, etc., between the rows and around the borders of the fields. A few farmers sow rye and hairy vetch with the corn at the last cultivation; about 30 pounds of rye per acre and 10 to 12 pounds of vetch seed. This affords excellent fall feed, and may be pastured again for a while in the spring before being plowed under. So far as known, this practice has been followed only with dairy cows and hogs, but it would do equally well with sheep.

Rape might also be grown with corn to make fall feed for sheep, but as yet very few, if any, farmers have tried it in this way. In the New England States, the common practice is to sow either broadcast or in drills, 2 to 3 pounds per acre, between the rows of corn at the last cultivation, about July 1 to 15. It makes excellent forage, though care must be taken to avoid loss from bloat when the sheep are first turned into it. With abundant moisture and the long-growing season, rape should do well in the corn-growing districts of the Northwest, and, if used to supplement the regular pastures, would be a valuable means of increasing the stock-carrying capacity of many small farms.

#### WINTER FEEDS.

Alfalfa hay constitutes the principal winter feed for sheep on irrigated farms. Perhaps a half or more of the farmers feed nothing else, and as a rule, with plenty of good hay, little else is needed. It is usually desirable, however, to add to the ration some kind of succulent feed such as mangels, sugar beets, beet pulp, silage, etc. Where corn can be grown, silage is becoming popular for this purpose. To ewes in lamb, care should be taken not to feed too much, and never to feed sheep any silage that is frozen or moldy. It is considered permissible to feed 3 pounds of silage to 1 pound of hay.

Sheep will make good use of dry roughage of various kinds. Where straw of wheat, oats, beans, clover, etc., is available, it is well to utilize such feed to supplement the more valuable alfalfa hay. Grain in any quantity is seldom required. Many sheepmen, however, feed a little grain of some kind, preferably oats, to their ewes about lambing time. Some start a month or six weeks before they are to lamb, while others do not give any grain until after lambing. Usually half a pound to a pound per head per day is enough. Plenty of fresh water and salt should be provided at all times.

#### **COOPERATIVE RELATIONSHIPS.**

In irrigated regions where sheep are to be kept, it is desirable that there be community development of the industry; that there shall be many farms with flocks of conservative numbers, rather than only a few farms with large flocks. With sheep on many farms, as found in some communities, cooperation among individuals or groups of farmers may be advantageous along several lines, such as the securing of ewes or other breeding stock, the purchase of oil cake, grain, or other supplies in car lots, the marketing of mutton, wool, etc.

Cooperation along one or more of these lines has already been very successful in a number of localities, especially in southern Idaho, where cooperative associations of sheep men were organized in the spring of 1918 with a membership of over 300 farmers, whose flocks averaged about 54 head. The purpose of the association is to stimulate production of a better class of sheep and wool, and cooperate in the marketing of wool and lambs. This association in 1918 handled a wool pool of nearly 130,000 pounds, with results much more satisfactory to the farmers than could have been obtained without the organization.

Cooperative relationships of this nature have a very important bearing upon the further development and stability of the farm sheep industry, and throughout the irrigated districts of the Northwest they should be more generally established.

#### **ORGANIZATION OF TWELVE REPRESENTATIVE FARMS.**

Farms in the Northwest on which sheep are kept, as a rule, produce a rather wide diversity of crops. In the organization of such farms, no definite systems have become established generally. Very few individual farmers have as yet settled upon any permanent plan to follow. To most of them keeping sheep is a new business. Indeed, much of what has so far been done toward getting sheep established on irrigated farms may be considered as experimental. Experience, undoubtedly, will in time show what systems of flock management and of farm organization are most satisfactory, or best

adapted to the conditions of each region. At present, a majority of the farmers who have but recently gone into the sheep business, and many who have had considerable experience, agree that much is yet to be learned about keeping sheep on irrigated farms. Among them and among others who contemplate going into the business, there is a keen desire for information on points relating to the organization of farms, so that sheep may be kept to advantage. On the care and management of farm flocks much has already been written;<sup>1</sup> but as to farm organization, systems have not been developed which can be recommended for general adoption in any region.

To irrigation farmers who have had little or no experience along this line, as well as to some who have been longer in the business, it should be of interest to know what practices are being followed by others. For such value as they may have in showing the present status of the industry and in suggesting how under certain conditions farms may be organized and managed so as successfully to include sheep, the experiences of a number of farmers are given in the following pages. In presenting these notes, it is not the intention to recommend that others do just what these individuals are doing or have done. Many of these men have doubtless already made, or will make, some changes in the plans they have been following. So with the exception of occasional comment, the notes are presented practically as given by the farmers. It is left largely for the reader to judge for himself as to whether or not the practices cited could be adapted with advantage to his own conditions.

#### **FARM No. 1.**

#### **SHEEP, DAIRY COWS, HOGS, BLUEGRASS AND CLOVER PASTURE. SOUTHERN IDAHO.**

This farm, near the town of Twin Falls, is one on which a particularly well-balanced organization seems to have been attained. Nominally it contains 120 acres, but deducting waste in roads, ditches, etc., there remains for cultivation only a little more than 100 acres. Such land in this locality is valued at \$300 or more per acre. Sheep have been kept more than 8 years. Dairying and hog raising occupy a prominent place, and at the same time there is a considerable diversity in crop production. On February 1, 1918, there were 70 mature ewes on the farm, 30 ewe lambs (yearlings), and 21 rams, all pure-bred Shropshires. The owner stated that it was his intention to increase the flock, and ultimately to maintain regularly 150 breeding ewes. In addition to the sheep he keeps usually 8 dairy cows, 3 to 5 heifers, and a bull; 3 to 4 brood sows

<sup>1</sup> See Farmers' Bulletin 840, *Farm Sheep for Beginners*, U. S. Department of Agriculture Bulletin 20, *Management of Sheep on the Farm*, and U. S. Department of Agriculture Bulletin 573, *The Sheep Industry on the Minidoka Reclamation Project*. Of these, the latter is particularly valuable for irrigation farmers.



from which he gets two litters a year; 4 heavy draft mares and a span of light driving horses. From the mares he raises colts. Cream is sold to a local creamery.

The crops grown in 1917 serve to illustrate the diversity of the cropping system. There were 13 acres of barley, 16 acres of wheat, 3 acres of oats, 10 acres of alfalfa, 13 acres of potatoes, 4 acres of sugar beets, 35 acres of mixed-grass pasture for cattle, sheep, and horses, 2 acres of hog pasture, and 7 acres of orchard, garden, etc.

The main pasture is divided into two approximately equal parts, which are used alternately from early in the spring, usually about April 1, up to the latter part of July or early in August, when the stubble fields are ready to receive the stock. If there is much grain left in the stubble, hogs are put in for a while before other stock is admitted. Cattle, sheep, and horses are pastured together during the summer, but hogs are not allowed in the main pasture. The owner says that running the cattle and sheep together keeps the pasture from becoming "bunchy." After he can get the sheep and other stock on the stubble and other fields, he saves the mixed-grass pasture as much as possible for late fall use. In 1916 he was able to keep the young cattle on it until the end of December. During the winter the sheep have the run of the farm unless the ground is muddy. They have access to grain-straw stacks and are fed pea straw, bean straw, alsike clover chaff, or some other such cheap feed as may be on the farm or obtainable in the vicinity. Then, for about 6 weeks at lambing time, they are given some alfalfa hay, sometimes a little grain, and also beets or mangels once a day.

In the spring of 1917 the flock consisted of only 50 bred ewes and 32 ewe lambs, no rams having been kept over. From the 50 ewes he obtained 69 lambs, of which number 65 were raised. The 82 sheep yielded 750 pounds of wool, which was sold for 53 cents per pound. He has been selling ram lambs in bunches at \$20 to \$25 per head, while singly some have brought \$50.

The permanent pasture on this place was particularly fine when inspected early in October, 1917. Twenty-five acres of it was originally red clover, which the owner had been cutting for seed and hay. Into this the bluegrass had come of itself with the irrigation water. The other 10 acres had been seeded with a mixture of Kentucky bluegrass, English bluegrass, and red clover. Little red clover was left after five years, but a considerable amount of white clover had come in. Some white clover seed also was sown and harrowed in with a spike-tooth harrow. The pasture is usually irrigated about every two weeks during the summer.

The manure saved on this farm is used on the pasture and hay land. There is enough to cover 10 to 15 acres per year, applying at the rate of 10 to 12 tons per acre. The coarse, "strawy" manure

goes on the pasture. The owner says that the application of manure about doubles the production of grass. No manure, however, is applied to the alfalfa land the year it is to be plowed up for potatoes. It is rich enough for potatoes without it, and would be too rich for grain, as it would make too much straw. The alfalfa is left down three to five years, then is followed by potatoes one year. After potatoes, the land is in grain two years. Alfalfa or clover is sown with the grain the second year, completing the rotation.

**FARM No. 2.****SHEEP; BLUEGRASS PASTURE; TIMOTHY PASTURE.****YAKIMA VALLEY, WASH.**

This farm is located near Ellensburg, Wash. It contains 115 acres of good farm land. The owner has kept sheep for 15 years. The present flock is of pure-bred Shropshires. At the first of the year, 1917, it consisted of 103 mature ewes, 40 ewe lambs (yearlings), and 40 ram lambs. The following spring, 151 lambs were born, making the flock total over 300 head to go on pasture. In addition to the sheep, the place was carrying 8 dairy cattle and 8 horses. No hogs were kept.

Hay is the principal crop grown. Timothy and alfalfa usually occupy about 80 acres, wheat 15 acres, and pasture about 20 acres. The pasture used in 1917 was divided into four lots. Over half of it was timothy meadow and the rest bluegrass. The owner's plan is to pasture sheep on a piece of timothy for about three years, then plow it up and grow oats or wheat on the ground for a year or two before reseeding to timothy. He thinks that by this rotation his yields of hay are half a ton per acre more than before pasturing. The bluegrass he thinks will last indefinitely if kept well irrigated.

The sheep are put on pasture usually late in March or early in April, and are confined mainly to the regular pasture area during the early part of the summer. After the timothy hay is cut, about the middle of July, and the second crop of alfalfa is put up, the hay fields are available for pasturing. The grass is allowed to grow for a couple of weeks after cutting before the sheep are admitted. In 1917 three sheep were lost by bloat and two were killed by dogs. During the winter the sheep receive chopped alfalfa hay, about 3 pounds per day, and at lambing time the ewes get about 2 pounds of grain, usually oats 1½ pounds and one-half pound of bran.

The fleeces in 1917 averaged 9 pounds each, and were sold for 60 cents per pound. All the lambs of the 1917 crop were kept. This farmer's usual practice has been to keep the ram lambs until a year old, and then sell them for breeding. The price for such lambs in the fall has been \$16 to \$20, while for yearlings he has received \$30 to \$40 per head.

**FARM No. 3.****SHEEP; BEES; MIXED-GRASS PASTURE.****YELLOWSTONE VALLEY, MONT.**

On this 40-acre farm of the Huntley Reclamation Project, Montana, sheep have been kept for 5 years or more as the principal live-stock enterprise. In January, 1918, the flock consisted of 74 head in all; 70 of them bred ewes. In addition to the sheep, the only other stock was 1 cow, 4 horses, and poultry. Beekeeping is also an important part of the farm business, and fits in well with the sheep so far as the labor requirements are concerned. The owner of the farm has adopted this type of farm organization with a view to eliminating heavy labor, which he is unable to do, and to avoid the necessity of employing hired help. The bees in 1918 were unusually profitable. From 21 stands which he had at the beginning of the season and 19 new swarms, he obtained 7,200 pounds of honey which he sold at from 20 to 23½ cents per pound.

Deducting land occupied by the public road, buildings, etc., the tillable area of the farm is perhaps a couple acres less than forty. Of the tillable area, about half is seeded to mixed-grass pasture, one-fourth to alfalfa, and the remainder in 1918 was sown to wheat. The first of the permanent pasture was seeded about the middle of August, 1916. The seed was drilled into wheat stubble. The land was irrigated immediately after and kept moist during the fall. An excellent stand was obtained, and results equally satisfactory were obtained by the same method in seeding 13 acres near the end of August the year following. The mixture used was essentially the same as recommended by the superintendent of the Huntley Experiment Farm, 22 pounds of seed per acre being required.<sup>1</sup>

Three cuttings of hay were made from the 10 acres of alfalfa in 1918, or a total of about 30 tons. One cutting of hay was made also from about 2 acres of the mixed grass, the yield of this being estimated at nearly 3 tons per acre. The wheat field of approximately 8½ acres yielded 316 bushels.

The owner's experience with sheep on the farm has been somewhat varied. At first he had only alfalfa for pasture, and by his system of handling the sheep, the loss from bloat was considerable. From May 20, 1916, to early in March, 1917, he carried about 100 head on alfalfa hay without pasturing at all. During the season of 1917, he kept a flock of 43 mature sheep and 51 lambs, partly on alfalfa pasture and partly on the original seeding of mixed-grass pasture, losing none by bloat. In 1918 the sheep were kept on the mixed-grass pasture up to November 1, when they were given access to the alfalfa meadow. At the beginning of the season there were

<sup>1</sup> See U. S. Department of Agriculture, Bureau of Plant Industry D. R. P. 2, "Irrigated Pastures of Northern Reclamation Projects," 1916.

74 sheep and 81 spring lambs. Two sheep and 5 spring lambs were lost by bloat. In wintering, alfalfa has been the principal feed. He has never fed any grain. In the winter of 1917-18 some wheat and oat straw were fed to supplement the hay. This was purchased for \$1 per load, in the stack. An inexpensive open shed affords the only shelter necessary, and the feed racks for hay constitute about all the additional equipment provided for the sheep.

In 1917 the wool from 43 sheep, sheared about June 1, amounted to 410 pounds, and brought \$259. The fleeces from the yearlings averaged about 12½ pounds each, and from the old sheep they ranged from 6 to 9 pounds. Twenty-one wether lambs sold in August at an average weight of 79¼ pounds brought \$209. Some of the lambs weighed 95 pounds. In 1918 the clip from 69 sheep weighed 694 pounds and was sold for \$459. The 81 lambs were sold late in August for \$1,053, or \$13 each, at the farm. Their average weight was 91 pounds. About the middle of November the breeding stock was sold for 13 cents per pound, the owner expecting to restock again later with young ewes.

#### **FARM No. 4.**

#### **SHEEP; PASTURE OF ORCHARD GRASS AND ALFALFA MIXED.**

#### **SOUTHERN IDAHO.**

This farm, also in the Twin Falls region, is cited as an example of one organized especially for the production of live stock. Sheep have been kept since 1911, when the start was made with 200 pure-bred Lincolns. The following year, after disposing of the Lincolns, 300 fine-wool range ewes were obtained. More were bought later, and since that time about 400 were kept up to 1917, when, on account of pastures becoming a little foul, the flock was reduced to about 165. At the beginning of February, 1918, there were 214 head. The owner thinks that by his system he will be able to keep about 400 head normally on his farm, which contains 160 acres. He had at this time, also, 18 horses and colts, and he usually keeps 8 to 10 cattle. The horses raised are pure-bred Percherons (registered). Shropshire rams are used with the sheep. Hogs are raised only for home use.

The general plan followed on this farm is to raise 20 to 25 acres of grain each year, and hay and pasture on about 130 acres. In seeding the grass land, a mixture of 3 to 5 pounds of orchard grass with 8 to 10 pounds of alfalfa is used per acre. It is sown broadcast after drilling in wheat.

Starting in the spring about April 1 to 15, the sheep are pastured for a while on all the grass land, then after a month or so are taken off part of it and restricted to 60 or 80 acres, which carry them until the second crop of hay is taken off the part not pastured. Sometimes a third cutting is made from a small acreage to get hay for cows.

The sheep are on the grain stubble for a while in the fall, and on one or two occasions some spring and fall pasture has been obtained outside the farm. This farmer usually counts on putting up 35 to 40 tons of hay for each 100 sheep, and about 75 tons for other stock. He tries to maintain a balance between hay and live stock so as to avoid the necessity of buying feed. During the winter the ewes are kept on the mixed hay, which they are required to clean up. Up to lambing time they are fed only once a day; then they are fed twice daily. With the exception of an individual ewe occasionally, they receive no grain at all.

The fleeces from the grade Shropshires run from 9½ to 12 pounds. The lambs are usually marketed fat right off the pasture about November 1, weighing about 70 to 73 pounds per head.

This pasture mixture of orchard grass and alfalfa is being used by others in the same locality, and is said to be very satisfactory, while hay made from it is better for horses than alfalfa alone. The owner of this farm says that an acre of the pasture will carry 6 to 7 of his ewes with their lambs throughout the season. The first year that he kept sheep, his loss from bloat was heavy, due mainly, he thinks, to the fact that he took the sheep off the pasture every night. Since the first year he has kept them on day and night and the loss from this cause he thinks has averaged considerably less than 5 per cent per year.

This farm, which is farther from town than the others heretofore cited, is valued at \$150 to \$175 per acre.

#### **FARM No. 5.**

#### **SHEEP IN ORCHARDS; MEADOW FESCUE AND ALFALFA MIXED.**

#### **YAKIMA VALLEY, WASH.**

On this 80-acre farm near Yakima, Wash., practically the entire area is devoted to apple orchard, the trees being 9 to 11 years old in 1918. The whole orchard has been seeded to alfalfa, which is cut for hay, except a small part reserved for sheep pasture. The experience with sheep on this farm has been as follows:

In November, 1916, 20 old ewes were purchased at \$6 per head. During the winter they were fed alfalfa hay, and for about a month at lambing time they were given about one-half pound of oats per day each. They lambed early in March. Twin lambs were weak, and most of them died. Four ewes did not have lambs. Only 15 lambs were saved. This flock, numbering 35 head, including the lambs, was put on pasture in the orchard as soon as the alfalfa began to show green in the spring. The pasture utilized during most of the season contained about 4 acres. On about half of it was a good stand of alfalfa, into which meadow fescue at the rate of 8 pounds per acre had been sown in the spring of 1916. The remainder of the

pasture lot produced mostly weeds, with some orchard grass, scattering alfalfa, salt grass, etc. The alfalfa and fescue mixture made excellent pasture. The sheep showed a preference for the alfalfa, but ate the fescue before the orchard grass. There were not enough sheep to keep this pasture down, and there was feed to spare at the last of August.

Early in August, 10 wether lambs, averaging 100 pounds each, were sold at 12½ cents per pound, bringing \$125 income. Fleeces from the 20 ewes in the spring of 1917 averaged 11½ pounds each, and brought \$95. The ewes and ewe lambs were kept, and in the fall 60 more old ewes were bought at \$8 each.

Some of the ewes were so old that they would not eat alfalfa hay readily the following winter, and did not do well at first, so the hay was ground, and beet pulp and bran were added to the ration. This feed gave better results. Because of the age and poor condition of the ewes, the lamb crop was light. Only 65 lambs were saved.

As soon as the alfalfa had started sufficiently to keep them going, the sheep were given the run of the whole orchard for about a month in the spring of 1918. After that they were confined to an area of about 20 acres. This was divided into three lots of about 4 acres each, and one of about 8 acres. From one 4-acre lot the sheep pastured off the equivalent of the first cutting of hay; from another the second cutting; and from the 8-acre lot a part of what would otherwise have been the third cutting. The rest of the time they were on the 4-acre lot that had been pastured during the previous summer. On 6 acres of the sheep pasture was a good stand of meadow fescue, mixed with the alfalfa. The character of this pasture as it appeared late in June is shown by figure 5. The cut also shows the low-headed apple trees which are typical of northwestern orchards.

The practice on this farm, so far, has been to take the sheep off the pasture each night and confine them in a corral. During the first summer there was no loss from bloat, but early in the spring of 1918 six ewes were lost in this way and two died of other causes.

Twice during the first summer, the trunks of the apple trees in the pasture were painted with a lime-sulphur paste to prevent the sheep from barking them. This paste was the residue left from the winter spraying. It appeared to possess some efficacy, and was used again the following summer with a little crude carbolic acid mixed with it; but the trees were either not kept so carefully painted or else the preparation was less of a deterrent than it was at first thought to be, for nearly all the trees in part of the pasture were badly barked. The damage was done principally to the limbs near their junction with the trunk.

In the spring of 1918, 70 sheep sheared 703 pounds of wool which brought \$314. Early in September, 13 lambs averaging 90 pounds were sold at 12½ cents, bringing \$146. Most of the old ewes were to

go to the butcher in the fall, but 25 of the best of them and all ewe lambs were to be kept. The owner thinks he would have done better if he had bought younger ewes to start with. As to the pasture, he does not contemplate changing the plan on which he has started.

#### A TYPICAL FARM.

The foregoing (Farm No. 5) is cited as an illustration of a distinct type to be found in large numbers, particularly in Oregon, Washington, and Idaho. In the Hood River region of Oregon, and the



FIG. 5.—Meadow fescue and alfalfa mixture for sheep pasture in a Yakima Valley orchard. The trunks of the low-headed trees were twice painted during the season with a lime-sulphur paste to prevent the sheep from barking them.

Wenatchee Valley of Washington, practically all farms are of this type. In the Yakima Valley, Wash., and in parts of Idaho as well, hundreds of such farms are devoted almost exclusively to the production of fruit, principally apples. As a rule, no live stock is kept except a team, and perhaps a family cow, some poultry, and occasionally a few hogs. Until quite recently it was uncommon in some of the regions mentioned to find even a family cow on farms of this kind. Fruit has been practically the only source of income.

During the past 10 years, clean cultivation of orchards has given way to the production of permanent cover crops, and now, particularly in orchards of bearing age, the growing of alfalfa or clover is almost the general practice. These crops, of which alfalfa is the more common, are grown primarily for their value in maintaining soil fertility and not as a direct source of income. Many orchardists,

however, desiring to utilize the alfalfa for feed, take off one or more cuttings of hay. Frequently, hay taken from the orchards is sold.

With reference to its bearing on soil fertility, selling hay from the orchard can not be recommended as a regular practice. To feed the hay on the farm and put the manure on the orchard, may be considered a conservative practice so far as the welfare of the soil is concerned; but this practice involves a great deal of labor, and with trees carrying a heavy load of fruit it is difficult, if not altogether impracticable, to get the second and third cuttings out of the orchard. As exemplified by the farm cited, the desire to avoid the labor of haying, and at the same time utilize the feed and retain the fertility, has led a few farmers to try pasturing off the orchard cover crops. This plan would without doubt be best for the soil, the most economical of labor, and most profitable, if the stock could be kept from injuring the trees and fruit. In this point lies the chief difficulty of putting this plan into practice. Pasturing cattle in the orchards is conceded to be out of the question. As a rule, hogs also do more or less damage to the trees and fruit; besides, if a sufficient number are kept to use any considerable amount of pasture, too much grain has to be purchased for fattening. In the opinion of the writer, sheep can be handled to better advantage than any other class of live stock on farms of this type, particularly if it is desired to pasture off the alfalfa.

But if sheep are to be pastured in the orchard, it is evident that the trees must be protected. With this in mind, orchardists might find it practicable to adopt the English method in the use of hurdles, panels, or nets of woven wire to keep the sheep away from the trees, and at the same time restrict their grazing to such an area as would be cleaned up in a comparatively short time. The panels or hurdles would have to be moved ahead daily or at frequent intervals to admit fresh feed. Lambs while young could have unrestricted range of the orchard, but later would have to be confined also, as they may do more damage than the mature sheep. By this method a flock of 25 to 50 ewes could be handled without very much labor. So far as known this system, common in England, and used to some extent in the United States, has not been tried on a commercial scale by orchardists or others in the Northwest. It is suggested for their consideration.<sup>1</sup>

#### **FARM No. 6.**

#### **SHEEP; ALFALFA PASTURE; BLUEGRASS PASTURE.**

#### **SOUTHERN IDAHO.**

This farm on the Twin Falls South-Side Tract contains nominally 80 acres, there being 72 acres of farm land, and 8 acres in building sites, etc. The crops grown in 1917 illustrate a diversity typical of the region. They were as follows: Alfalfa for hay, 23 acres; wheat, 7

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<sup>1</sup> For types of hurdles, panels, standards for supporting nets, etc., see *Farmers' Bulletin* 810.



acres; sugar beets, 6 acres; beans, 7 acres; corn,  $1\frac{1}{2}$  acres; orchard,  $1\frac{1}{2}$  acres; potatoes, 1 acre; pasture of mixed grasses (mainly bluegrass), 15 acres; alfalfa pasture, 10 acres. On October 1, 1917, the live stock consisted of 4 work horses, 2 milch cows, 15 hogs, poultry, and the flock of sheep. The owner stated that he could handle the place with only 3 horses. Until the price of feed became prohibitive, more hogs had been kept, 85 having been on the farm October 1, 1916.

The start with sheep was made with range ewes, carrying the usual fine-wool blood. In breeding on the farm, Lincoln rams were used for 3 years and Shropshires 3 years. In February, 1917, there were 147 mature sheep. The increase, amounting to 163 lambs, made a total of 310 head to go on pasture in the spring, or about 12 per acre. The lambs were sold early in the spring for  $12\frac{1}{2}$  cents per pound, the first lot being delivered about June 1, and the remainder about the middle of September. In 1917, 146 fleeces weighed 1,500 pounds, or about 10 pounds per fleece.

The pasture land was divided into 3 lots and the sheep were changed frequently from one lot to another. In 1917 they were started on the bluegrass about May 1. This was a very late season. During August the ewes were kept on short pasture, so that they would not be too fat for breeding. They were returned to good feed when the rams were put with them the first week in September. In pasturing alfalfa the owner permits it to get a good start before turning the sheep in, then when once on it they are left there day and night. His loss from bloat during 6 years has been insignificant. The pastures have no shade.

In the fall, after the crops are off, the sheep clean up the fields. In 1917, as an experiment, the sheep were turned into the beet field before the beets were pulled. It was thought they might eat off the tops without disturbing the beets, but some old ewes that had eaten beets before were not satisfied with the tops only, so the flock had to be removed. During the winter the sheep are kept mainly on alfalfa hay.

#### **FARM No. 7.**

#### **SHEEP; ALFALFA PASTURE.**

#### **SOUTHERN IDAHO.**

This is another 80-acre farm in Idaho, near farm No. 6. In 1917 there were in this farm 12 acres of potatoes, 12 acres of beans, 3 acres of corn for silage, 3 acres of onions, 15 acres of wheat, 3 acres of bluegrass pasture, 30 acres of alfalfa, and a small family orchard. Sheep had been kept on this farm 4 years prior to October, 1917. In addition to the sheep, there were 2 cows for family use, 6 shoats, and 9 work horses and colts. Prior to the prohibitive advance in the price of feed, hog raising had been an important part of the farm

business. The owner stated that 4 horses would be sufficient to work a farm of 120 acres.

From the flock of 170 ewes, 190 lambs were obtained in 1917. Of this number, 30 pure-bred Cotswolds were retained. All the rest were sold on contract early in the spring at 12 cents per pound, the first lot being delivered about July 1 and the others August 15.

The sheep were pastured on the 30 acres of alfalfa and the other farm stock on the bluegrass. This farmer's alfalfa pasture was divided into 4 fields. His practice is to permit the alfalfa to get well started, up to 6 to 10 inches high and beginning to take on a dark color before turning the sheep into it. He is especially particular about this in the early part of the season while lambs are with the ewes. The change from a field that has been pastured off to a field of fresh pasture is usually made in the afternoon when the alfalfa is dry, and after the sheep have been on other feed until their hunger is about satisfied. When once on alfalfa the sheep are left there day and night. He has pastured alfalfa this way each year, and his loss from bloat, he said, had not exceeded 2 per cent any year. Up to the time the first bunch of lambs was taken away early in July, the 30 acres of alfalfa was carrying about 360 sheep, or 12 per acre. Two cuttings of hay were made also from a pasture lot of about 7 acres. But not enough hay was made on the farm to carry his stock through the winter.

Late in the fall the sheep have the run of the farm, and during winter access to wheat straw stacks. They have been fed straw also. It was found that they could be carried up to lambing time on such feed, without hay. A silo was built in 1917 with the intention of making silage a part of the winter ration for the sheep. In the opinion of this man bluegrass does not produce as much feed as alfalfa pasture.

In the fall of 1917 another 40-acre tract was purchased, thus increasing the size of the farm to 120 acres. The owner expressed the belief that with the 120 acres he would be able normally to keep 300 ewes, grow nearly all the feed required, and still have some room for cash crops. Of the 40 acres purchased, he planned to reserve one 15-acre field each year to be used exclusively for hay without pasturing. He thinks an alfalfa field should not be pastured more than 3 years before being plowed up. After plowing it he would plant to potatoes, but not to exceed 15 acres a year. If more than this amount were to be plowed up, the rest would be planted to spring wheat. Beans or spring wheat would follow potatoes. The next year the field would be sown to wheat, and alfalfa with it. He uses about 80 pounds of wheat per acre whether alfalfa is sown with it or not.

**FARM No. 8.****SHEEP; BEEF CATTLE; HOGS; ALFALFA PASTURE.****SOUTHERN IDAHO.**

From the standpoint of economy of man labor and because of the definite plan of management in connection with the production of sheep and other live stock, this farm is especially notable. It is near Kimberly, on the South-side Twin Falls Tract, and contains 120 acres of land valued at over \$300 per acre. Crop production is confined almost entirely to grain and alfalfa or clover. In 1917 alfalfa and clover occupied about one-half the farm, and wheat and barley nearly half. There were about 4 acres of potatoes, a few stock beets, and a small family orchard and garden. February 1, 1918, the farm was carrying 180 sheep—152 ewes and 28 rams—all pure-bred Cotswolds. The foundation stock had been obtained 2 years before.

The plan of farm management is to pasture the sheep on the 60 acres of clover or alfalfa in the spring until about June 1, beginning usually early in April. June 1 the sheep are removed from 20 acres of the clover and restricted to the remaining 40 acres. About July 1 a crop of hay is taken from the 20-acre field, which should yield about 2 tons per acre. The flock is then turned into the hay field, and a crop of hay is produced on the 40-acre field which has been pastured up to this time. About 2 tons per acre should be taken from this 40 by August 20. After the hay is off, the sheep are pastured on half of the 40-acre field until early in September, and the other half produces a second crop of hay to be cut in October; it should yield a ton or more per acre. About September 5 breeding begins and the ewes are given access to the 20-acre piece from which hay was cut early in July, and which has not been pastured since August 20. This supplies good feed during the breeding season, and then, after the last cutting of hay is off, the whole 60-acre tract is again available for late fall pasture. By this system the 60-acre tract of alfalfa is expected to carry the sheep during the entire pasture season, and at the same time produce 125 to 150 tons of hay. The plan is to leave the clover or alfalfa down 3 years, and rotate with wheat. The wheat is marketed as a cash crop, and the hay is fed to sheep, cattle and work animals. Potato growing is to be discontinued because digging conflicts with putting up the late hay crop. Stock beets are fed to sheep and hogs. The grain stubble fields are pastured by hogs and cattle.

Before the advance in the price of feed, about 300 hogs a year had been raised on the farm, but the hogs were nearly all closed out in August, 1917, leaving only 25 head. About 8 milch cows are kept, a large part of the milk being used for raising calves. Young calves are purchased and the milk of each cow raises two or more calves during the summer. The calves do most of the milking. On the farm in October, 1917, were 23 small calves, 10 of them weaned.

After the first summer the calves are put with a herd and sent out on the range to be pastured until fall, when they are brought back for wintering. Three mules and one horse are kept. These are said to be sufficient to run the farm with the exception of a day or two at thrashing time.

For about 5 months during the winter, the farm carries the sheep, the breeding hogs, about 40 cattle, and the work animals. During 1917 about \$100 worth of feed was bought. This included \$45 paid for fall pasture, \$40 worth of straw for the cattle, and \$15 worth of alsike and red clover straw for the sheep. The sheep were fed on this straw up to the latter part of January, a couple of weeks before lambing time. After that the principal feed was ground alfalfa hay, about 4 pounds per head per day.

Feeding this amount of live stock during 4 or 5 months results in the production of considerable manure, which is highly valued. The owner of the farm stated that by the use of sheep manure on alfalfa land, the yield of hay may be increased a ton or more per acre.

#### FARM No. 9.

#### SHEEP; HOGS; POULTRY; ALFALFA PASTURE.

#### YAKIMA VALLEY, WASH.

On this farm near Yakima, sheep have been kept regularly for about 17 years, and the owner believes that, under his conditions, they require less labor and pay better than any other class of live stock. The farm contains 160 acres, but half of it is not irrigated, and there is a very scant water supply for the other half. The water is obtained from a well. The dry land produces nothing but a little weed pasture early in the spring. The crops grown in 1916 show the usual diversity of production on the irrigated land, being as follows: Alfalfa for hay, 30 acres; alfalfa for sheep pasture, 12 acres; corn, 20 acres; wheat, 6 acres; oats, 6 acres; potatoes and turnips, 4 acres; hog pasture, etc., 2 acres. Usually about 100 tons of hay are for sale each year. Most of the other crops grown are fed on the farm.

In the spring of 1917 the mature sheep and yearlings totaled 167 head, being grade Lincolns bred up from Merino foundation stock. One hundred and twelve lambs were obtained from the 106 ewes, making about 279 head in all to go on pasture. In addition to the sheep, the farm was carrying 8 horses, 4 cows, 15 sows with pigs, and during the season a large number of turkeys, geese, and chickens were raised for market.

In handling the sheep, the usual practice has been to pasture them on alfalfa, which is divided into 4 lots. When one lot has been grazed off short, the sheep are put on another where the growth is several inches high. Some years a cutting of hay is obtained from one or

more of the pasture lots. During the summer of 1917, however, the sheep had unrestricted range of the 30-acre alfalfa field from which they had been taken the previous year. This season it was not irrigated, consequently the growth was slow. By the middle of August the feed was so short that the ground appeared to be nearly bare, and the sheep were thin. There were more than the usual number of sheep on the farm this summer, as lambs were to be kept over to get the wool clip in 1918, whereas in former years the practice has been to sell lambs in the spring or early summer. By the method followed in former years, when sheep were transferred frequently from short feed to fresh pasture, the loss from bloat usually amounted to about 10 per cent per year. During 1917 the loss from this cause was about 6 per cent. Because of the heavy loss sustained each year, the owner proposed to establish a pasture of mixed grasses. His pastures have no shade. Throughout the year the sheep are brought into the barn lot at night as a precaution against loss from coyotes or dogs.

About the 1st of August the grain stubble is ready for pasturing. The sheep are left on this at first only a couple of hours in the morning and for a similar period in the evening. Then, when the third cutting of alfalfa hay and other crops are off, they have the run of the farm until crops are planted the following spring.

During the winter the sheep have access to straw stacks, and are fed alfalfa hay, corn fodder, and a few turnips. With the other roughage available, it is not necessary to feed much hay, perhaps about 2 pounds each per day. For a period of about two months at lambing time, some grain is fed; about one-half pound per head per day.

Lambing begins about February 1, a time when there is very little general farm work to do. Throughout the year the work of taking sheep to and from pasture is done mainly by small boys. The winter feeding is said to require not more than an hour a day for one man. In 1917 the wool clip from 167 sheep averaged 10 pounds per fleece. In former years when sheep were better fed, the fleeces were said to average 12 to 14 pounds. Usually the lambs are sold early. In 1916 the average weight of the first lot sold was 62½ pounds, and of the second lot, 82 pounds; the price that year was 9½ cents per pound.

#### **FARM No. 10.**

#### **SHEEP; DAIRY COWS; HOGS; FRUIT.**

#### **YAKIMA VALLEY, WASH.**

This farm is in the Yakima Valley, near Grandview. It contains 42 acres, cropped in 1917 as follows: Orchard, 15 acres; potatoes, 8 acres; beans, 3½ acres; corn, 5 acres; grapes, 1 acre; sugar beets, 4½ acres; sheep pasture, 3 acres; alfalfa, about 2 acres. All the orchard but 2½ acres was seeded to alfalfa, from which three cuttings of hay are usually taken off each season. Some manure is applied to compensate for hay removed.

During the summer of 1917 the farm was carrying 6 dairy cows, 1 heifer, 1 bull, 5 horses, 16 hogs and 49 sheep. Eight ewes and a ram had been carried through the previous winter. From the 9 head the wool clip, at 45 cents per pound, brought \$45.90. In the spring, 40 orphan lambs were purchased at \$1 each. Of these, 33 were raised on cow's milk. The owner stated that he expected to get pure-bred sheep later, and to keep regularly about 50 ewes. According to his estimate, the labor of caring for a flock during most of the year amounts to no more than feeding and watering his cows.

The sheep have been kept all the time on 3 acres of bluegrass pasture, which included one bank of an irrigation ditch. The pasture was not good. To make up the deficiency in pasture, the sheep were fed once a day on whatever forage happened to be available—hay, cornstalks, grape prunings, weeds, etc. During the winter the sheep have had only hay. The owner would have no live stock of any kind in his orchard. He said that wherever he had seen sheep, calves, or hogs in an orchard, they had damaged the trees.

#### FARM No. 11.

#### SHEEP ON FARM PART OF YEAR ONLY, "FLYING STOCK."

#### SOUTHERN IDAHO.

This farm, near Gooding, in southern Idaho, is cited to illustrate a system that as yet is practiced scarcely at all on irrigated farms of the Northwest. It is similar to one which has been followed successfully for many years on sheep farms in parts of Scotland. By this system the farm carries only what is known as "flying stock," meaning that the sheep, whether bred on the farm or bought, are kept for only one year or less. In this instance the owner of the farm purchases old ewes early in the fall, keeps them until the following summer, when they are sold, fat, with their lambs, by the middle of July or earlier.

He usually buys 300 to 400 old ewes, but does not want "broken mouths" or "gummers"; "spread mouths," however, are satisfactory. During the fall they are kept on alfalfa or other pasture. He has 40 acres of alfalfa on his own farm, and additional pasture is rented. During the winter the sheep are kept on alfalfa hay, which is fed in racks, and to some extent they also have access to straw stacks. Fresh hay is supplied twice daily. The coarse stems that are left by the sheep are fed to stock cattle and horses. Seven or eight head of such stock will clean up after 100 sheep. He keeps dairy cows also, but they get only good hay. At about lambing time the ewes are given a little grain.

In the spring and early summer the sheep are pastured mainly on alfalfa. This usually results in some loss from bloat, though not enough materially to affect the profits. As a precaution against

such loss the sheep are not put on to the alfalfa when very hungry. The owner usually gives them a good feed of alfalfa hay in the morning, then herds them out along the roads or other place where they get a little grass, and starts them on the alfalfa early in the afternoon. He watches them at this time, and turns back the ones which are inclined to rush ahead to fill up on the choicest feed. They are all held back somewhat and kept bunched, and soon they begin to lie down. Started in this way, the sheep do not eat heavily at first, and, being kept quiet afterwards, few are lost by bloating.

Early in the summer, about June 1, the operator begins turning off the lambs, "tops" going first. He consigns mutton and lambs to the St. Joseph, Mo., market. Sometimes stock of other growers is combined with his to make full cars. Usually everything is disposed of by the middle of July. By this system there is a period of about 3 months each year when no sheep are on the farm.

After the sheep are sold a cutting or more of hay is obtained from the alfalfa fields that have been pastured earlier in the season. Hay made after pasturing in this way is said to be less "stemmy," i. e., finer than the first cutting made from fields not pastured. The yields of meadows do not keep up so long when pastured, but after being plowed up and reseeded, increased yields are obtained. On this farm manure has been applied to alfalfa land in addition to that left by pasturing.

Handled by the system described, sheep have been profitable for this man, who states that one year he cleared over \$2,000 on his flock. After 4 years' experience he was planning to develop a more extensive business along this same line.

#### **FARM No. 12.**

#### **SHEEP FEEDING IN WINTER; SUGAR BEETS.**

#### **YELLOWSTONE VALLEY, MONT.**

Another system of handling sheep on irrigated farms where it is not desired to keep them throughout the year is to buy in the fall, feed for a period of 4 or 5 months, and sell early, without pasturing at all in the spring. One farmer on the Huntley Reclamation Project has followed his plan with success and profit for 5 years or more. His farm contains 47 acres of irrigated land, on which, in 1917, the principal field crops were as follows: Twenty-one acres of sugar beets; 9 acres of alfalfa; 11 acres of oats; 1 acre of corn. Some wheat was grown also on a piece of nonirrigated land which he rented. Sugar beets are the main cash crop. They have been grown continuously on the same land for 9 years or more, and one of the chief reasons for feeding sheep is to get manure for the beet ground. Largely due to the use of manure, the yields of beets every year are materially greater than the average for the region. Four work horses, a cow or

two, and some poultry are the only live stock kept on the farm regularly. Hogs have never been raised.

This farmer usually buys from 550 to 750 lambs in the fall, and feeds them for about 4 months. The beet tops are used first. An acre of tops, he says, is equal to  $1\frac{1}{2}$  tons of hay. After the beet tops are gone, he feeds alfalfa hay and a little straw, but never any grain. A considerable amount of hay has to be bought from neighboring farmers.

The special equipment required for feeding as he does it consists of 21 feed racks, each 16 feet long, shown in figure 6; and an inclosure 48 feet square made of tight shiplap panels 16 feet long and  $4\frac{1}{2}$  feet high. These panels are wired to posts which are set in the ground.



FIG. 6.—Winter feeding of sheep on a sugar-beet farm in the Yellowstone Valley, Montana. This affords profitable winter employment, and enables the farmer to grow a larger crop of sugar beets.

The sheep are confined in this fold at night and when not feeding. No shelter from snow or rain is provided. The feed racks are set so that a wagon may be driven between them. They are filled each day, in the morning, before the sheep are released from the fold. About twice a week a load of straw is placed in the fold. This serves mainly as bedding and goes into manure. Water is pumped from a well with a small gas engine. After the feeding season is over the feed racks are knocked down by removing the ends; the panels of the fold are unwired from the posts and all material is piled out of the way until needed the next fall. The ground which has been occupied by sheep is planted to beets.

In the fall of 1917 558 Rambouillet lambs averaging about 51 pounds each, and altogether weighing 28,640 pounds, were bought on the 9th of November for 15 cents per pound, or a total of \$4,296. Ten lambs died. After feeding 127 days, 548 lambs, averaging about



70 pounds, and altogether weighing 38,150 pounds, were sold March 16 for 17 cents per pound, or \$6,485, which was \$2,189 increase over the purchase price. The gain this year was a little better than usual, but in the owner's experience of 5 years he has always got gains of 16 pounds or more per head. The value of the 21 acres of beet tops fed was estimated at \$210. Sheep men in that vicinity were paying \$10 to \$12 per acre for them that year. Other items of expense were given as follows: Sixty-seven tons of hay, at \$14.50 per ton, \$971.50; 25 tons of straw, at \$2.50 per ton, \$62.50; salt, gasoline, etc., \$10; hired labor, 1 man for 13 days, at \$3, \$39; interest on investment, \$140. The total expense for items above noted equaled \$1,433. Deducting this amount from \$2,189, leaves \$756 net gain.

Thus it may be considered that the farmer got \$756 in return for his labor in handling the lambs during a 4-months' period when otherwise there would have been practically nothing to do. The time he actually spent in hauling hay, feeding, etc., he estimated at 450 hours, or 56 eight-hour days. Not to overlook the important reason for feeding sheep, it should be added that he estimated the manure obtained at about 230 tons, valued at \$2.50 per ton. In addition to lamb feeding, he also fed 100 rams on contract for two and a half months at \$3 per head.

### **OUTLOOK FOR FURTHER DEVELOPMENT OF THE SHEEP INDUSTRY ON IRRIGATED FARMS.**

The farms above cited illustrate some of the varied conditions under which sheep are being kept to good advantage on irrigated farms, and show that the business is one that need not be confined to farms or any particular size or type or locality. Without question, conditions on some farms and in some localities are more favorable for keeping sheep than conditions generally, but there are not many irrigated farms anywhere in the Northwest on which small flocks of sheep could not be kept with profit, if given proper care. As sheep are now being kept on comparatively few of these farms, there is opportunity for a considerable expansion of the industry in the irrigated regions, providing good systems of management are worked out. The present outlook for the sheep business appears to warrant further expansion, and there seems to be no reason why many more farmers who possess the qualifications for handling sheep should not keep at least small flocks. Relatively few irrigation farmers have had experience with sheep. This fact, and the lack of knowledge as to the possibilities of profit from the sheep industry, are doubtless the principal reasons why sheep are not now more common on irrigated farms. In some localities, county agricultural agents and extension workers are holding farmers' schools or institutes for the purpose of extending knowledge relative to the sheep industry.